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1992 R&D Spending by U.S. Firms Rises, NSF Survey Improved

by Raymond M. Wolfe

U.S. industry spent $121 billion on R&D in 1992, up 3.7 percent from 1991.

Estimates from the National Science Foundation's Survey of Industrial Research and Development show that firms spent $121 billion on research and development (R&D) in the United States during 1992, or 3.7 percent more than during 1991. Adjusted for inflation, this level reflected a 0.8-percent increase. Company and other nonfederal sources funded 80 percent ($97 billion) of the 1992 total, and the Federal Government funded the remaining 20 percent ($25 billion) through contracts and grants to industry. Sources of 1992 nonfederal funding increased by 6.7 percent compared with 1991 estimates, whereas Federal funding declined by 6.5 percent. The bulk of this decline, reported for firms in the aircraft and missile industries, reflected continuing cuts in Department of Defense funding. The table at the end of this Data Brief gives summary statistics for selected industries from the 1992 survey and compares them with revised statistics for 1991.

The Survey of Industrial Research and Development, which has been conducted annually since 1954, recently has undergone substantial changes. Two of the major improvements—annual sampling and larger sample size—are summarized in this Data Brief.

Previous to the 1992 survey, the sample of firms surveyed was selected about every 5 years. In intervening years a panel of the largest firms known to perform R&D was surveyed. For the 1987 survey about 14,000 firms were selected for the sample. For the 1988 through 1991 studies, approximately 1,600 of these firms were annually resurveyed; the other firms did not receive another questionnaire, and their R&D data were estimated. To produce statistics that are more reliable and that reflect the widening population of R&D performers among firms in the nonmanufacturing industries and small firms in all industries, and to better account for births of R&D performing firms, NSF decided to (1) draw new samples annually and (2) increase the sample size to approximately 23,000 firms beginning with the 1992 survey. Annual sampling also will remedy the cyclical deterioration of the statistics that results from mergers, acquisitions, and other corporate structural changes and will help to gather more current information about potential R&D performers. Note that revised 1991 data were collected at the same time as the 1992 data, so the year-to-year changes reported in this Data Brief are not affected by changes in the survey sampling procedure.

The old sample design was adequate during the early years of the survey because the performance of R&D remained concentrated in the manufacturing industries. Beginning in the early 1970s, the need for more detailed nonmanufacturing R&D information was recognized, and so statistics for the broad industry classifications "miscellaneous business services" and "miscellaneous services" were published. About 3 percent of the 1975 industry R&D total was estimated to have been performed by firms in nonmanufacturing industries. During the mid-1980s there was evidence that an increasing number of nonmanufacturing firms were conducting a significant amount of R&D, and again the number of industries for which statistics were published was expanded. The annual reports for 1987 and since have included separate R&D estimates for firms in the communication, utility, engineering, architectural, research, development, testing, computer programming, and data processing service industries, hospitals, and medical labs. Approximately 9 percent of industrial R&D performance during 1987 was undertaken by nonmanufacturing firms, and for 1992 the share rose to 25 percent of the total.

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Additionally, the pre-1992 sample design was deficient in capturing births of new R&D performing firms; the entry of fledgling R&D performers into the marketplace simply was missed during panel years. By casting a wider sampling net more frequently, the new sample will capture more small R&D performers as well as R&D performers among nonmanufacturers.

Other recent methodological and processing changes made to the survey include the updating of industry classifications used in the published reports to conform with the current Standard Industrial Classification (SIC) system, refinement of the method used to assign multi-unit companies the most appropriate industry classification, and a general overhaul of the computer system that is used to process returns and formulate final survey statistics.

The statistics in this Data Brief are being released in advance of the two reports produced annually from the survey. *Selected Data on Research and Development in Industry: 1992* will contain 16 tables of the most frequently requested statistics, and *Research and Development in Industry: 1992* will contain the full set of detailed statistical tables from the 1992 survey and a full description of all of the methodological and processing changes.

Table 1. Funds for industrial R&D. by source. industry. and size of company: 1991-92

Source of funds, industry, and size of company	Current dollars [in millions]			Constant dollars [1987 dollars in millions]		
	1991	1992	Percent change 1991-92	1991	1992	Percent change 1991-92
Total	116,952	121,314	3.7	99,364	100,177	0.8
	By source and performing industry					
Company and other nonfederal, total	90,580	96,654	6.7	76,958	79,813	3.7
Chemical and allied products	14,439	16,420	13.7	12,268	13,559	10.5
Petroleum refining and extraction	2,487	2,330	-6.3	2,113	1,924	-8.9
Office and computing machines	10,419	10,650	2.2	8,852	8,794	-0.7
Electrical equipment	8,865	9,689	9.3	7,532	8,001	6.2
Transportation equipment	14,858	15,726	5.8	12,624	12,986	2.9
Professional/scientific instruments	6,840	7,426	8.6	5,811	6,132	5.5
Nonmanufacturing industries	22,941	24,211	5.5	19,491	19,993	2.6
Federal, total	26,372	24,660	-6.5	22,406	20,363	-9.1
Petroleum refining and extraction	11	9	-18.2	9	7	-20.5
Fabricated metal products	226	293	29.6	192	242	26.0
Machinery (including computers)	1,055	1,062	0.7	896	877	-2.2
Electrical equipment	4,550	3,857	-15.2	3,866	3,185	-17.6
Aircraft and missiles	11,096	9,872	-11.0	9,427	8,152	-13.5
Professional/scientific instruments	1,865	2,226	19.4	1,585	1,838	16.0
Nonmanufacturing industries	5,505	5,892	7.0	4,677	4,865	4.0
	By size of company [based on number of employees]					
Fewer than 500	13,172	14,496	10.1	11,191	11,970	7.0
500 to 999	8,000	8,410	5.1	6,797	6,945	2.2
1,000 to 4,999	10,453	12,415	18.8	8,881	10,252	15.4
5,000 to 9,999	8,049	8,672	7.7	6,839	7,161	4.7
10,000 to 24,999	15,770	16,419	4.1	13,398	13,558	1.2
25,000 or more	61,508	60,902	-1.0	52,258	50,291	-3.8

SOURCE: National Science Foundation/SRS, Survey of Industrial Research and Development

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